

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

New claims 11 and 12 have been added.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-12 are now pending in this application.

Rejection under 35 U.S.C. § 102

Claims 1-4 and 6 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,823,746 (hereafter “Viola et al.”). This rejection is respectfully traversed.

Claim 1 recites a magnetostrictive torque sensor, comprising a rotating shaft rotating around a center axis and having magnetostrictive characteristics; and a cylindrical ferrite magnetic core disposed at a predetermined distance from an outer periphery of the rotating shaft and coaxially with the rotating shaft, and provided with a coil having an insulation coating to detect a strain of the rotating shaft, wherein the coil is provided on an inner peripheral surface of the core; wherein: the cylindrical ferrite magnetic core comprises a pair of opposed coil-forming inner peripheral surfaces formed by dividing the inner peripheral surface of the core into two parts along a plane that includes the center axis; and the coil has, on each of the pair of the opposed coil-forming inner peripheral surfaces, a first coil including a forward current coil and a feedback current coil connected in series and disposed at a same position inclined with an angle of +45° to the center axis, adapted to flow a forward current and a feedback current in a same direction, and a second coil including a forward current coil and a feedback current coil connected in series adapted to flow a forward current and a feedback current in a same direction, and disposed at a same position inclined with an angle

of -45° to the center axis and crossing with the first coil. Claims 2-4 and 6 depend from claim 1.

Viola et al. discloses an embodiment of a torque sensor 10 that includes a plurality of sensing elements in the form of coil pairs 14 that are disposed over a shaft 12 and supported by a bobbin 16. See Viola et al. at col. 3, lines 15-21; Figure 1. In this embodiment, each coil pair 14 is also supported by a core 18 and each coil pair 14 includes a first coil 14a wound in a first direction and a second coil 14b wound in a second direction. See Viola et al. at col. 3, lines 21-25; Figure 1.

Viola et al. discloses another embodiment of a torque sensor 120 for detecting a magnetic field of a shaft 130. See Viola et al. at col. 7, lines 19-23. The sensor 120 includes coils 122 that are supported by a bobbin 124 and wound about cores 126. See Viola et al. at col. 7, lines 26-28; Figures 12-14. Viola et al. discloses a variation of this embodiment in which coils 142 are oriented to detect magnetic fields emanating from a shaft 150. See Viola et al. at col. 7, lines 57-63; Figure 15. The Office argues that this embodiment includes all of the features recited in claim 1. See Office Action at page 2.

However, the torque sensor 140 embodiment shown in Figure 15 and described in col. 7, lines 57-63, of Viola et al. does not include coils that have, on each of a pair of opposed coil-forming inner peripheral surfaces, a first coil with a forward current coil and a feedback current coil connected in series and adapted to flow a forward current and a feedback current in a same direction, and a second coil with a forward current coil and a feedback current coil connected in series adapted to flow a forward current and a feedback current in a same direction and crossing with the first coil, as recited in claim 1. Viola et al. does not describe coils 142 as coil pairs or disclose that coils 142 include a first coil and a second coil. As shown in Figure 15, each coil 142 includes a single coil that is wound in a single direction. The coils 122 of the previous, but similar, embodiment also include a single coil that is wound in a single direction, as shown in Figures 12-14.

Furthermore, the core elements of the embodiment shown in Figure 15 do not include a pair of opposed coil-forming inner peripheral surfaces, as recited in claim 1. As shown in

Figure 15, each core element is merely bent so that it is oriented at an angle relative to the shaft 150. Each core element does not form a pair of opposed coil-forming inner peripheral surfaces. Even if the core elements of Figure 15 could be considered to form a pair of opposed coil-forming inner peripheral surfaces, the coils 142 do not form a first coil and a second coil on each of the pair of opposed coil-forming inner peripheral surfaces, as recited in claim 1. Nor does Viola et al. disclose that these core elements shown in Figure 15 are oriented at an angle of $+45^\circ$ or -45° . Viola et al. provides no teaching or suggestion as to what angle the core elements are oriented relative to the shaft in Figure 15. See M.P.E.P. § 2125.

After noting the embodiment shown in Figure 15 of Viola et al., the Office argues that Viola et al. does disclose a coil that includes a first coil and a second coil, as recited in claim 1. The Office supports this position by noting col. 5, line 7, of Viola et al. However, this passage refers to a different embodiment of a sensor that includes coil pairs 42 comprised of a first coil 42a and a second coil 42b. See Viola et al. at col. 4, line 58, to col. 5, line 14; Figures 5-7. The Office is apparently combining the teachings of two different embodiments to reject claims 1-4 and 6 as being anticipated by Viola et al., i.e., by combining the embodiment of Figures 5-7 and the embodiment of Figure 15. As noted above, the embodiment of Figure 15 does not disclose a coil that includes first or second coils on each of a pair of opposed coil-forming inner surfaces of a core or that the first and second coils are oriented at respective angles of $+45^\circ$ and -45° , as recited in claim 1. However, Applicant respectfully submits that such a rejection is not a proper anticipation rejection under 35 U.S.C. § 102 because it modifies the teachings of two different embodiments or arrangements disclosed by Viola et al. to create a combination of sensor components that is not disclosed by Viola et al.

Furthermore, even if it would have been obvious to one of ordinary skill in the art to make such a combination, Applicant respectfully submits that this combination does not provide all of the features recited by claim 1 because the embodiment shown in Figures 5-7 of Viola et al. does not remedy the deficiencies of the embodiment of Figure 15.

Claim 2 depends from claim 1. Applicant respectfully submits that claim 2 is allowable over Viola et al. for at least the reasons discussed above. Claim 2 further recites “wherein: the cylindrical ferrite magnetic core includes a pair of semi-cylindrical ferrite magnetic cores divided into two parts along a plane including the center axis.” However, none of the embodiments of Viola et al. disclose the features of claim 2, which includes the features of claim 1, “wherein: the cylindrical ferrite magnetic core includes a pair of semi-cylindrical ferrite magnetic cores divided into two parts along a plane including the center axis.”

For at least the reasons discussed above, withdrawal of this rejection is respectfully requested.

New Claims

New claims 11 and 12 have been added. Claims 11 and 12 depend from claim 1. Applicant respectfully submits that claims 11 and 12 are allowable over Viola et al. for at least the reasons discussed above. Applicant respectfully submits that claims 11 and 12 are also allowable over Viola et al. because Viola et al. does not disclose or suggest the features recited in claims 11 and 12.

Allowable Subject Matter

Applicant gratefully acknowledges the indication that claims 5 and 7-10 include allowable subject matter.

Applicant submits that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a

check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

OCT 30 2007

Date _____

By _____

FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (202) 672-5426
Facsimile: (202) 672-5399

Glenn Law
Attorney for Applicant
Registration No. 34,371